

## content

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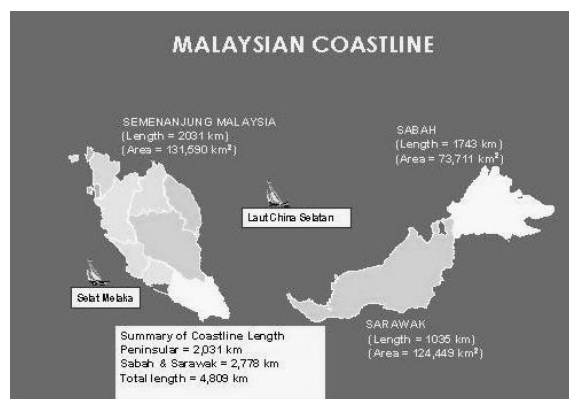
### Coastal Management - Activities

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#### Background



Realising the increasing incidences of coastal erosion which threatens coastal population and leads to loss of properties along the coastlines, the Government has carried out the National Coastal Erosion Study from November 1984 to January 1986 and the study results indicate that out of the country's coastline of 4,809 km, about 29% or 1,380 km was facing erosion. In order to cope with this problem, the Government has set up the Coastal Engineering Centre in the Department of Irrigation and Drainage (DID) in 1987 to implement coastal erosion control program throughout the country.



The Malaysian coastline varies from scenic bays flanked by rocky headlands to shallow mud flats lined with mangrove forests. On the east coast of Peninsular Malaysia, the high sediment yield from river discharges and harsher wave environment create the setting for a coastline of hook-shaped sandy bays. Whilst on the west coast, the mild wave climate of the Straits of Malacca make for wide mud shores and coastal forests rich in biodiversity. Similar forms characterised the beaches of Sarawak and Sabah although certain sandy areas are very flat. Shore materials include a mix of sand, silts, and even shells with some patches of gravels and the occasional rock outcrops.

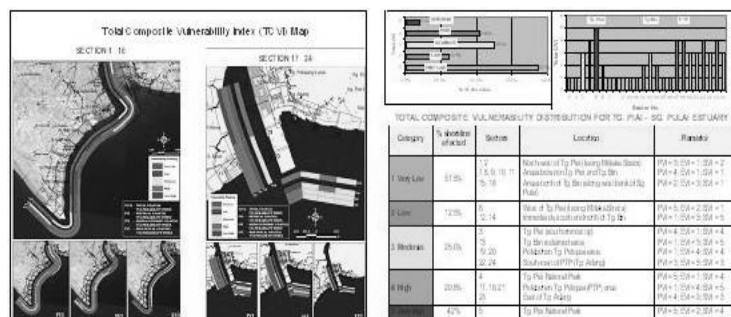


There are more than 150 river mouths in Malaysia and many of them are facing siltation problem, which reduces the water depth for fishing access and has negative impact on the development of fishing industry. The Government has carried out the National River Mouth Study in 1994 and the study results indicate that 35 river mouths faced critical siltation. The master plan developed recommends that improvement work be carried out in 10 years involving a total cost of RM 330 millions. Based on the master plan, a river mouth improvement program was approved under the Seventh Malaysia Plan for carrying out dredging and construction of improvement structures.



## Coastal Zone Management Activities

National Coastal Erosion Study was completed in 1986 and the study findings revealed that out of the country's total coastline of 4,809 km, about 29% or 1,380 km is facing erosion problem. In order to tackle this problem, the Government has set up the Coastal Engineering Technical Centre within the Department of Irrigation and Drainage (DID) in 1987 to implement coastal erosion control program for the whole country. The program involves two strategies, i.e., and both long-term and short-term strategies. The short-term strategy involves construction of erosion control projects and the long-term strategy involves improving coastal zone management in an integrated manner so that incidences of coastal erosion will not increase.



## National Coastal Vulnerability (to sea level rise) Index Study

### National Coastal Vulnerability Index (NCVI)

National Coastal Vulnerability Index Study is required to identify coastal area exposed to the effect of sea level rise. The result of the study will be used to prepare Coastal Vulnerability Index with level of exposure to coastal area so that any development in these areas can be

avoided. At the same time it will be the basis to implement protection measure caused by sea level rise. The index will provide an indicator as to how vulnerable the coastline is to the impacts of accelerated sea level rise. Vulnerability to impacts encompasses biogeophysical, economic, and institutional and socio-cultural factors. A comprehensive development of NCVI will be carried out in phases.

The first phase of the NCVI study has been completed in December 2007. It covers two (2) pilot sites namely Tg. Piai, Johore in the South, and Pulau Langkawi, Kedah in the north.

Based on a 20-year tidal record at the two pilot sites, the rate of the local or relative sea level rise at both sites may be considered to be smaller than the average global-low rate of 2 – 3 mm/year (i.e. SLR at Tg Piai = 0.2 – 1.3 mm/yr; SLR at Langkawi = 0.5 – 1.0 mm/yr)

The increase in flood levels at both sites for the local SLR scenario is not significantly high.

## 1.0 Coastal Erosion

Based on National Coastal Erosion Study 1986, Malaysia's shoreline are classified into three categories of erosion depending to the threat it caused to the existing shore-based facilities of substantial economic value and defined as follows:

**Category 1:** Shorelines currently in a state of erosion and where shore-based facilities or infrastructure are in immediate danger collapse or damage.

**Category 2:** Shoreline eroding at a rate whereby public property and agriculture land of value will become threatened within 5 to 10 years unless remedial action is taken;

**Category 3:** Undeveloped shoreline experiencing erosion but with no or minor consequent economic loss if left unchecked.

### List of Coastal Erosion Areas:

State	Distance (KM)	Eroded Coastal (Categorised as follows)						Total Of Distance/Eroded Coastals		
		Category 1		Category 2		Category 3		(KM)	Unit	(%)
Perlis	20	4.4	3	3.7	1	6.4	4	14.5	8	72.5
Kedah	148	31.4	16	2.2	1	9.9	3	43.5	20	29.4
Pulau Pinang	152	42.4	9	19.7	5	1.1	1	63.2	15	41.6
Perak	230	28.3	4	18.8	2	93.1	4	140.2	10	61.0
Selangor	213	63.5	10	22.3	7	66.1	3	151.9	20	71.3
N. Sembilan	58	3.9	2	7.7	4	12.9	1	24.5	7	42.2
Melaka	73	15.6	5	15.1	2	6	2	36.7	9	50.3
Johor	492	28.9	9	50.3	9	155.6	11	234.8	29	47.7
Pahang	271	12.4	11	5.2	3	107.8	8	125.4	22	46.3
Terengganu	244	20	6	10	6	122.4	10	152.4	22	62.5
Kelantan	71	5	3	9.5	3	37.6	5	52.1	11	73.4
W.P Labuan	59	2.5	2	3	2	25.1	2	30.6	6	51.9
Sarawak	1035	17.3	8	22.3	10	9.6	7	49.2	25	4.8
Sabah	1743	12.8	5	3.5	2	279.2	12	295.5	19	17.0
Total	4809	288	93	193	57	933	73	1414.5	223	29.41

\* click on image to view actual size

The cause of erosion are both natural and man-induced. A beach in its natural state experiences cycles and deposition but over a long period of time, a beach is considered stable if its mean position remains unchanged. In most cases, the root cause of erosion have been man-made activities which result in direct or residual impact to the nearshore and the beach. Among causes of erosion as listed below:

a) Causes of erosion – natural

- Major storms during high tide

b) Causes of erosion – man-made

- Ports/harbour
- Marinas
- Bridge, etc

## 1.2 Coastal Erosion Mitigation Measures

### a) Hard Engineering

- Revetment
- Groynes
- Breakwater
- Concrete Blocks
- Training wall

### b) Soft Engineering

- Beach nourishment
- Mangrove Replanting
- Sediment filled geotextile breakwaters
- Pressure Equalization Module

## 2.0 Integrated Shoreline Management Plan (ISMP)

The ISMP programs carried out by the DID is tailored along the principles of ICZM to address the major issues and problems facing our shoreline. It is an integrated approach that takes into account all the sectoral activities that affect the coastal areas and gives due consideration to economic, social, environmental and ecological issues. The goal is to develop a management tool to harmonise all the activities in the coastal area to support a broader set of management objectives for the coastal area

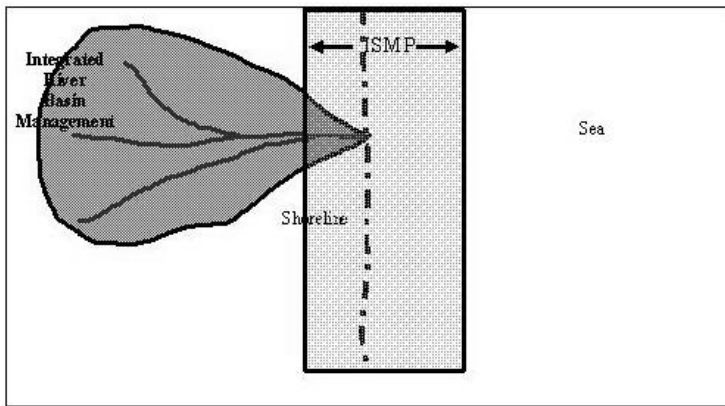
### 2.1 Objective of ISMP

- Appraisal and selection of coastal development management strategies so that the development in the coastal area can be carried out in a sustainable manner.
- Appraisal and selection of defence options for the coastline.
- Formulation of Specific Guidelines and Policies for Development Activities/Proposals in the coastal area.

### 2.2 Determination Of Limit Of Shoreline Area

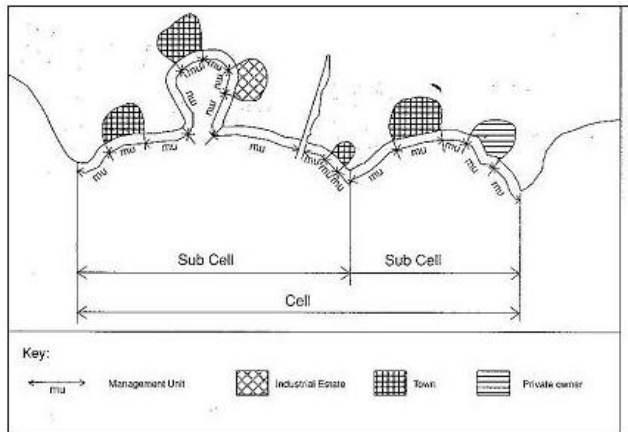
One of the important decisions in carrying out the ISMP is to determine the limits of the shoreline area. The management area should include all the coastal resources of interest and also include all the coastal processes. The limit may vary from place to place, but as a general guide, the following landward and seaward limits have been adopted:-

- Landward limit is about 1 km from shoreline (at MHWS).
- Seaward limit is about 3 km where the coastal processes have little impact on the shoreline.



### 2.3 Division Of The Shoreline Into Management Unit

Over a length of shoreline, the physical characteristics, coastal features and land use vary tremendously, making it rather difficult to formulate meaningful guidelines or policies. In order to overcome this problem the shoreline is sub-divided into smaller units called management units. A Management Unit can be defined as a length of shoreline with coherent characteristics in terms of both natural coastal processes and land use. An illustration of the management unit is as shown as below.



### 2.4 Status To Date

To date, JPS Malaysia has completed ISMP for Pahang, Melaka, Negeri Sembilan, Pulau Pinang, Labuan and Miri, Sarawak. Two other ISMP is currently ongoing that is ISMP Sabah and ISMP Johor.

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